

1938

STRAN-STEEL

CONSTRUCTION DATA



STRAN-STEEL DIVISION
GREAT LAKES STEEL CORPORATION
DETROIT, MICHIGAN

1938



EASY TO HANDLE

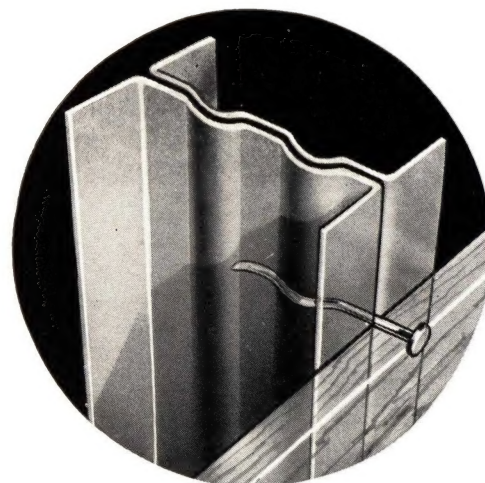
STRAN-STEEL sections are easy to handle. What cutting is required is done with a hack saw or on large jobs with a portable power saw. STRAN-STEEL standard lengths have been worked out so that a minimum of cutting is needed.

STRAIGHT AND TRUE

STRAN-STEEL sections are straight and true. It is not necessary to place the "crown" up, for there is no crown on STRAN-STEEL members. Being steel, they are free from knots, checks, tendency to split and warp, and will not change their dimensions due to atmospheric changes. These sections are made to machine limits and are entirely uniform. This is the case whether you use a short piece, or a much longer member.

ONLY SIMPLE TOOLS USED

In all cases, only ordinary hand tools used in general carpentry are required in erecting STRAN-STEEL. Where large quantities are used on a job, portable power saws are frequently used.



● STRAN-STEEL'S patented nailing groove is a curved space between two strips of channel-shaped steel welded back-to-back to form the member. Nails driven through collateral materials into this space are clinched in a grip of steel.

STRAN-STEEL RESIDENTIAL CONSTRUCTION

STRAN-STEEL is a strong and sturdy steel framing material for houses, partitions and all other light load-bearing structures. It is rigid, warp-proof, shrink-proof and provides a maximum of fire safety.

STANDARD MEMBERS

STRAN-STEEL is obtainable in the form of studs, joists, rafters and sill plates. It is carried in stock, cut to standard lengths to eliminate most of the cutting on the job.

NO CHANGE IN PLANS REQUIRED

The construction of a building in which STRAN-STEEL is used proceeds in the same way as if ordinary framing were used. Dimensions of STRAN-STEEL members conform exactly to the requirements of other materials used with it. Therefore, using STRAN-STEEL entails no change of architectural plan. Special detailing is not required. All standard exterior and interior materials may be used with STRAN-STEEL. It is erected easily and quickly by anyone skilled in carpentry and the usual practices of house construction. No welding is required. Connections are made with self-thread-cutting sheet metal screws.

SUPPLIED BY LUMBER DEALERS

In many cities STRAN-STEEL is available through lumber dealers who stock, sell and service this material. These dealers have the constant co-operation of the Great Lakes Steel Corporation, STRAN-STEEL Division.

STRAN-STEEL FLOOR CONSTRUCTION

If a concrete sub-floor is to be used, the top of the foundation paralleling the joists is constructed level with the top of the joist. Then anchor bolts are set in the wall in order to receive the bottom wall plate. If wood sub-floors are to be used, the foundation walls are built up so that the wood plate, laid on top of the foundation, is level with the top of the STRAN-STEEL joist. Anchor bolts should be placed 4' 0" on centers in the top of the wall to receive the STRAN-STEEL wall plates.

BRIDGING CLIPPED ON

Joists are set 24" on center, starting from a joist set flush with the inside of the built up foundation walls. This is the "starter joist." As the joists are set in place, the STRAN-STEEL bridging can be clipped on, so that when the last joist is placed, the job is ready for the application of the flooring.

CUTTING SELDOM NECESSARY

The joists are furnished to the job either cut to fit, or in standard lengths. These standard lengths have been carefully figured out, and often no cutting whatsoever is needed. At least a four-inch bearing on solid masonry is required. In certain cases the use of government anchors is required. The holes punched in the ends of the STRAN-STEEL joists may be used for anchors.

STRAN-STEEL WALL CONSTRUCTION

The erection of walls in STRAN-STEEL framing is quite simple and follows wood construction closely. One important deviation, however, is spacing, STRAN-STEEL standard studding being spaced 24" on centers. As in ordinary construction, complete sections of wall studding are assembled to the top plate and erected as a unit. Two screws in diagonally opposite flanges of the studs secure them at both top and bottom. Partition walls parallel to and between joists are set on partition supports. Outer walls parallel to joists are framed 8" higher than walls supporting joists.

Where there are no heat or plumbing stacks, and a partition wall is directly over a joist, the bottom plate is omitted, the joist doubled, and the studs are attached with 2" sections of plate secured directly to the joist.

SCREW HOLES PUNCHED IN ALL MEMBERS

Holes will be found in the flanges of each STRAN-STEEL stud and joist. Matching holes will be found in the flange and base of the STRAN-STEEL channel plate. These holes are used in fastening one STRAN-STEEL member to another. A self-thread-cutting screw is used in making these connections. This is a cadmium-plated sheet metal screw, easy to set in place, and will remain in place, holding securely for the life of the building.

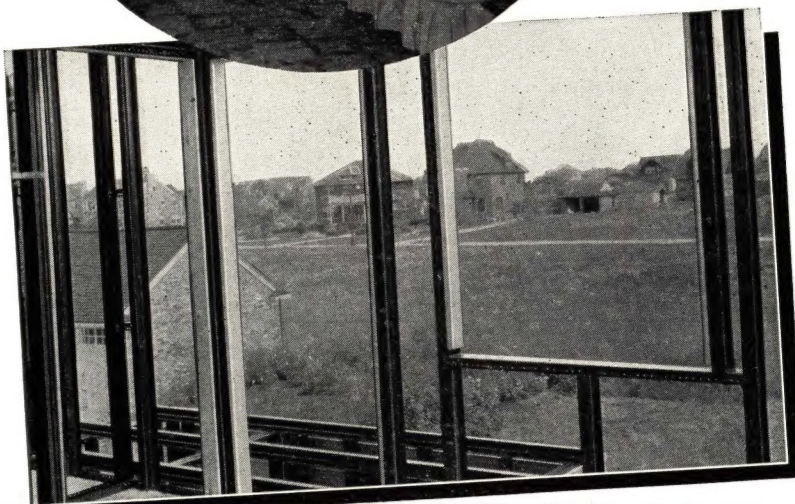
Holes in the web of the various STRAN-STEEL studs and joists are for the quick installation of conduit, plumbing, etc.



● Before pouring concrete sub-floor, metal lath is stapled directly to the STRAN-STEEL joists.



● Framing walls with STRAN-STEEL follows conventional practice, STRAN-STEEL studding and plates being handled like other materials. Spacing is 24" o.c.



STRAN-STEEL

ROOF FRAMING

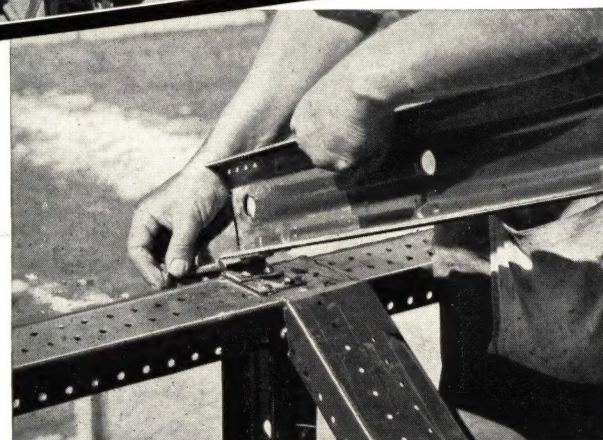
In residential roof construction, STRAN-STEEL provides permanence, rigidity and fire-safety, the most important factors in the construction of any roof. STRAN-STEEL eliminates rotting, warping, sagging and the consequent damage responsible for much of the expense of maintaining a home.

The design of a home determines which STRAN-STEEL members should be used. Their use conforms to standard practice, making it possible for anyone familiar with roof design and construction to select the proper members. STRAN-STEEL $3\frac{5}{8}$ " studs are used where 2×4 's are ordinarily used. And on roofs with long spans, STRAN-STEEL joists, or $3\frac{5}{8}$ " stud sections with supports, are used.

Although lightning is not considered a major hazard, it accounts for many fires and fatalities each year. Its destructiveness is greater in structures of poor electrical conductivity, such as wood, stone, brick and concrete. Should lightning strike a building framed with STRAN-STEEL, the bolt is immediately grounded through the framework itself, thus safeguarding both structure and occupants. STRAN-STEEL framing has no effect on radio reception.

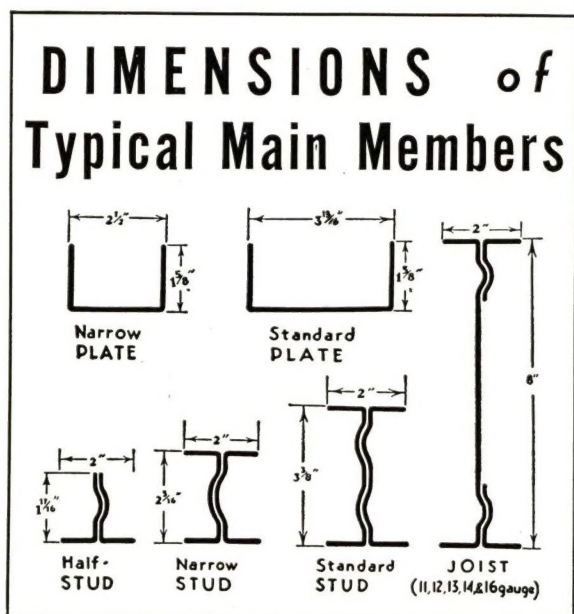
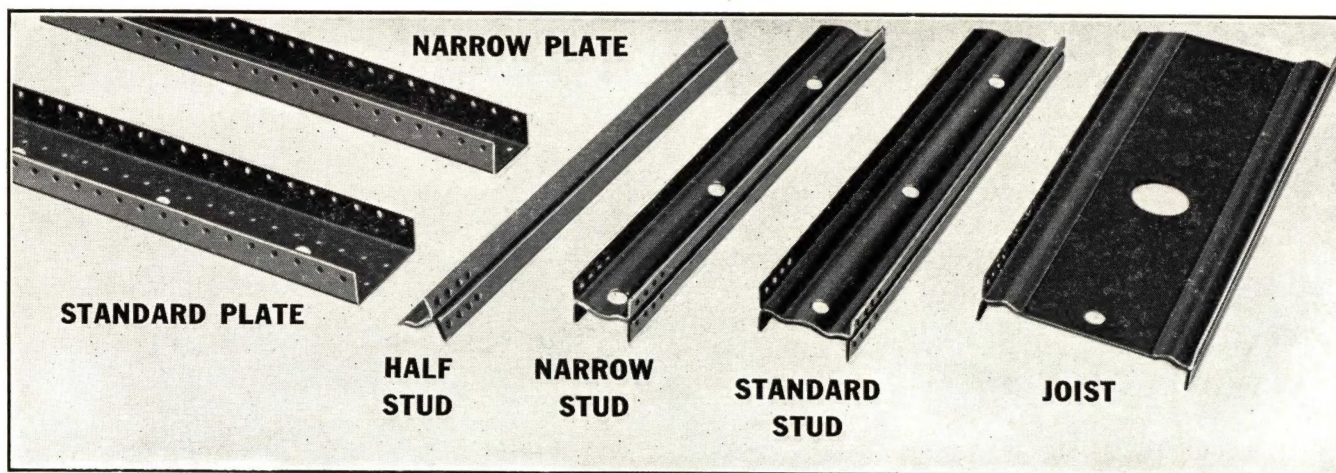


● Tightening bolts at rafter peak after rafters have been raised and temporarily braced in position.



● Inserting hinge pin in rafter hinge; the hinge takes care of any pitch roof and pin is held in place with cotter key.





● Width over flanges and depth of typical STRAN-STEEL members is shown here. See STRAN-STEEL Handbook for further details.

STRAN-STEEL MEMBERS

SIMPLICITY and adaptability characterize STRAN-STEEL. There are only three main members. One of these, the joist member, is supplied in various gauges to accommodate varying floor spans and loads. Studs and plate are furnished in several widths. Rafters are formed from either stud or joist sections.

TYPICAL JOIST—Joists are manufactured in five gauges—16-14-13-12-11. This member is used for floor joists and roof rafters. Recommended spacing 24" o.c. See Table of Properties—Page 14, or STRAN-STEEL Handbook.

STANDARD STUD—3 5/8" in depth with 2" flange—various gauges. This member is used for framing exterior walls up to two and one-half stories and interior bearing walls of two stories. Recommended spacing of STRAN-STEEL studding is 24" o.c. This member is also used for ceiling joists and roof rafters.

NARROW STUD—2 5/8" in depth with 2" flange. This member is used for framing exterior walls up to two stories in height and interior bearing and non-bearing walls. This member is also used for ceiling joists having light loads. This member is adaptable as furring around ducts, pipe chases, etc., where nailing of collateral materials is required.

HALF STUD—1 1/2" deep with 2" flange. This member is used as an auxiliary nailing piece to provide for nailing of collaterals where structural strength is not required.

STANDARD PLATE—3 1/8" wide with 1 5/8" flanges. This member is used with 3/8" stud section as a top and bottom plate and as

a sill and head member for window and door openings where nailing section is not desired. Holes in flanges punched at 1" intervals for stud connections. Punching in web of channel for anchor bolts at 6" intervals.

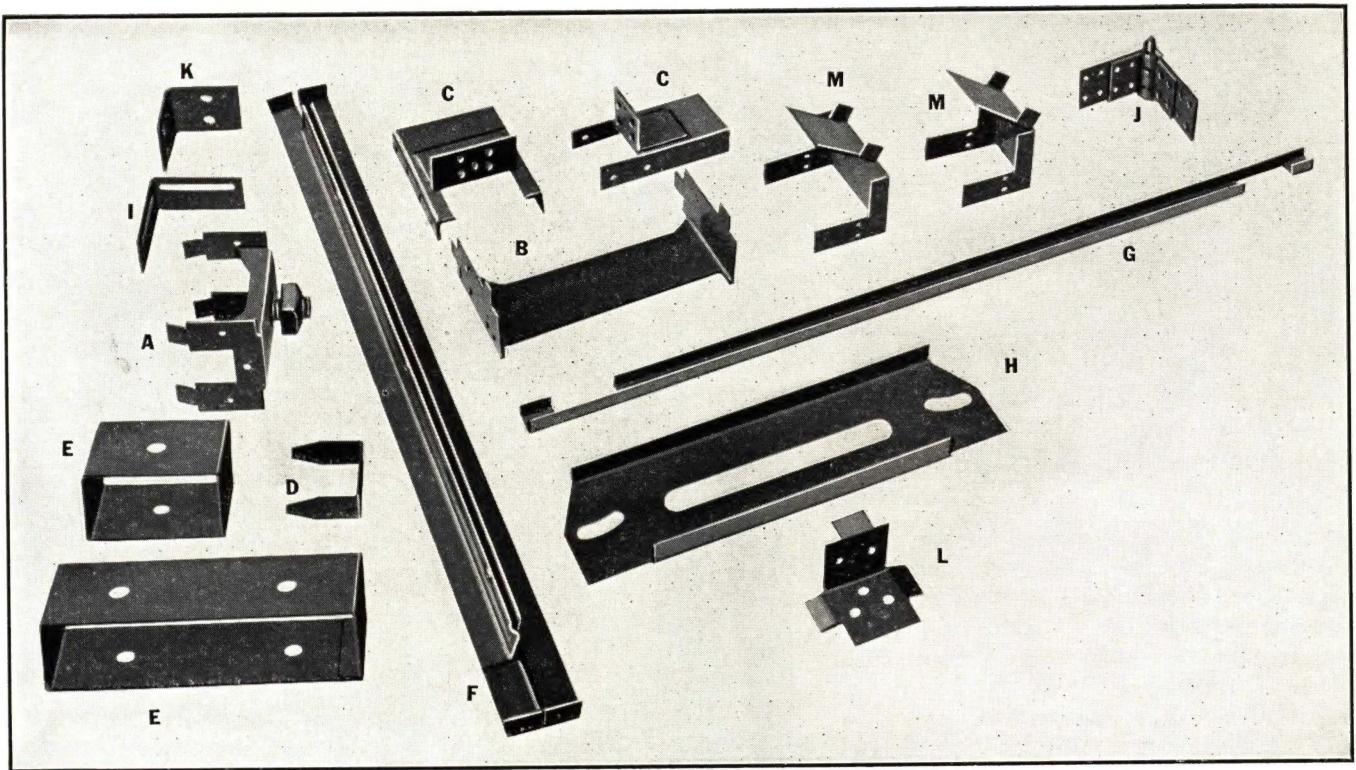
NARROW PLATE—2 1/2" wide with 1 5/8" flanges. This member used with narrow stud similar to standard channel plate with similar punching.

STANDARD PUNCHING FOR PIPE, WIRING, CONDUITS, ETC.

—All STRAN-STEEL main members are factory punched in the flanges except the half stud section. Holes are provided in the studding for the passage of conduits, etc. Joists are punched on top and bottom flanges with eight holes 1 1/4" in diameter, for the placing of screws. In the web, 1 1/4" from each end, a hole 1 3/8" in diameter for placing of a government anchor. In the web 36" apart, hole 2 3/8" in diameter for piping, etc.

FINISH—All STRAN-STEEL members and attachments are painted with a heavy dip-coat of special rust resisting red enamel. The finish is tough and very adhesive—will not chip and resists scratching in handling and erection.

STANDARD LENGTHS—See table on page 14.



STRAN-STEEL ATTACHMENTS

ONE of the features which has much to do with the rapid acceptance of STRAN-STEEL is the simplicity of the attachments. The illustrations and the descriptions show the striking degree to which all

attachments have been simplified. They are designed to interconnect all STRAN-STEEL members with metal-attaching screws, or bolts; several are also punched for nailing to main members for additional security.

A—COLLAR TIE BRACKET—For attaching members (used as collar ties) to rafters.

B—JOIST HANGER—For joists, various gauges. Attaches rapidly and securely with screws.

C—HEADER BRACKETS—For connecting joist headers and stud headers over openings.

D—"C-CLIP"—Driven into nailing grooves of adjacent parallel members as a tie. Usually spaced 18" to 3' apart.

E—HIP AND VALLEY COLLARS—For connecting rafters and jack rafters to the hip and valley members.

F—PARTITION SUPPORT—Used under each stud of non-bearing partitions which run parallel to and between joists.

G—BRIDGING, CHANNEL TYPE—Used in pairs between joists. Ends are coped out to engage joist flanges.

H—RAFTER PLATE—For connecting rafters and jack rafters to the hip and valley members.

I—CORNER BRACKET—Used at top and bottom of stud and plate corner; also bent to reinforce all corners other than 90° such as bays, etc.

J—RAFTER HINGE—Loose butt hinge with cotter key through hinge pin; connects lower ends of rafters to plate.

K—ANGLE BRACKET—Used to connect valley rafters to top wall plate.

L—COMBINATION CLIP—Connects stair carriage to adjacent stud; also used for tying half-stud lath backing to adjacent studs.

M—RAFTER CLIPS—Connects gable studs to rafters.

MUSHROOM-HEAD NAILS—2½" and 1⅝" Cadmium-plated or plain nails with 1" inverted cup heads, used for attaching gypsum board plaster base, insulating sheathing, etc.; large head secures adjacent edges of board joints. Supplied in 10-lb. cartons as an extra item, if specified; 10 lbs. required for 1000 sq. ft. of side wall; 15 lbs. required for 1000 sq. ft. of ceiling.

SCREWS—Cadmium-plated No. 14 sheet metal self-thread-cutting screws.

STRAN-STEEL

for INDUSTRIAL USES

PRODUCTS—STRAN-STEEL Steel Framing

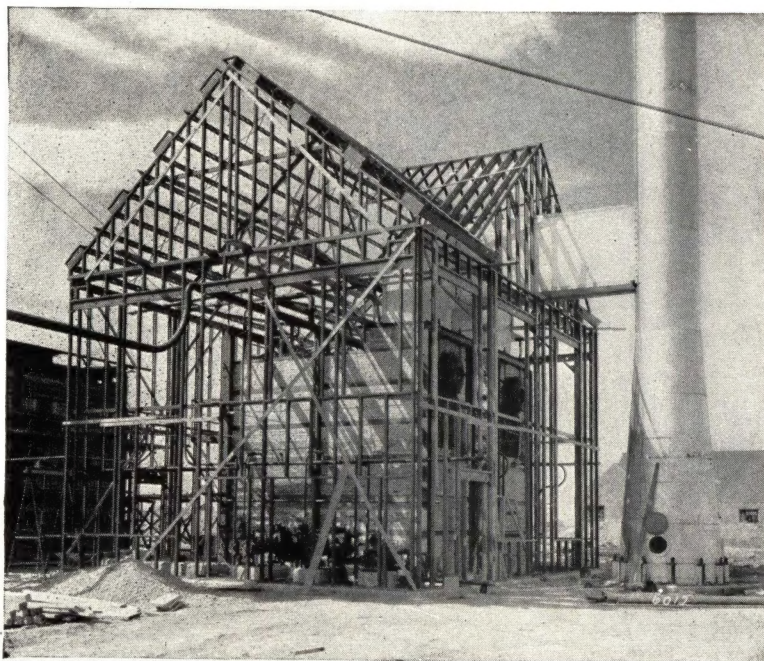
Originally used for dwelling house construction, the many advantages of STRAN-STEEL metal framing have caused its widespread use in industrial buildings. Few industries use such a wide variety of different sizes and types of buildings as the oil industry and it is in the construction of these buildings that STRAN-STEEL fills a long felt need.

STRAN-STEEL is Fire Safe, Shrink Proof, Termite Proof and Permanent. Because it is produced to conform to established dimensions of the materials which it replaces, its use requires no changes in architectural plans or dimensions. STRAN-STEEL permits the use of all standard exterior and interior materials and finishes. It is erected easily and rapidly by anyone skilled in carpentry. Connections are made by simple attachments, screw driver, and metal screws.

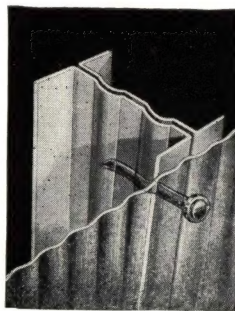
STRAN-STEEL is adaptable for industrial buildings, houses, partitions and all light load-bearing structures. A feature of its design (see phantom illustration) permits nailing collateral materials directly to the steel framework.

STRAN-STEEL is supplied in the form of joists, studs, rafters and plates. It is shop-coated with an adhesive finish which protects it so thoroughly that no field painting is required.

Framing a building with STRAN-STEEL follows the traditional practice closely, except that all members are ordinarily spaced on two-foot centers. This reduces the num-



● STRAN-STEEL being used in the construction of a refinery boiler house.



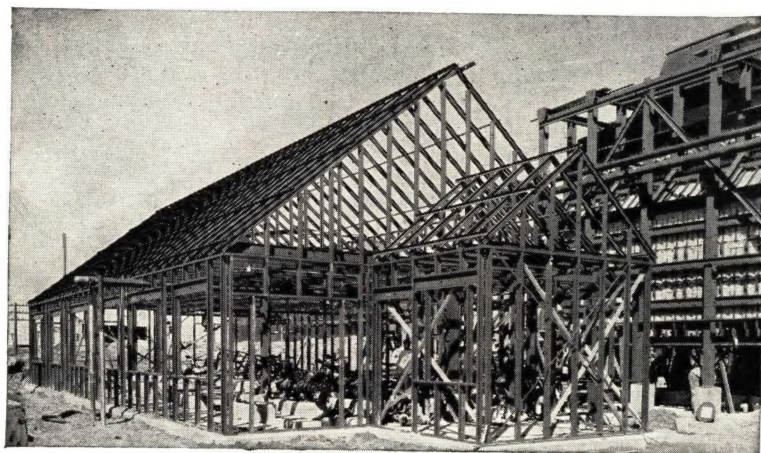
● Illustration shows how STRAN-STEEL is formed to receive and hold ordinary nails. Nails driven into the nailing groove hold with 25 per cent more grip than in wood.

ber of members used and materially simplifies certain subsequent operations such as duct work. Foundation thicknesses are unchanged. Standard STRAN-STEEL members are shown on page 4.

STRAN-STEEL framing used with fire-safe collateral materials makes a wholly fire-safe structure, an important feature for an oil country building. The steel framework being grounded the entire structure is lightning-proof. STRAN-STEEL, obviously, is termite-proof.

STRAN-STEEL is sold by the lineal foot. It is stocked in standard lengths. The plates and studs are stocked and shipped in conventional lengths and can be cut to size if necessary with a hack or power saw. This is a decided advantage and many oil companies and other concerns, who have a continuous building program under way, maintain stocks of this material in their various divisional storage yards and draw upon it as needed—saving both time and money.

Where companies have standardized their plans or maintain a staff of architects and engineers they will have no difficulty in adapting STRAN-STEEL to their regular construction specifications. To those firms who do not have such an organization, we



● STRAN-STEEL pump house under construction for oil country use.

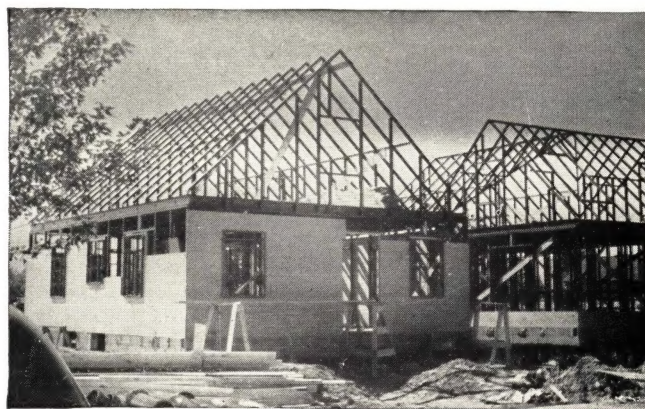


● STRAN-STEEL Construction is used extensively on pipe lines. A typical meter house.

offer you the services of our engineering department who will gladly cooperate with you and give you the benefit of their broad experience in industrial construction. Send us a rough sketch of the type of building you want, giving size, number of windows and doors, etc., and we will gladly submit suggestions and plans from which the building in question can be erected.

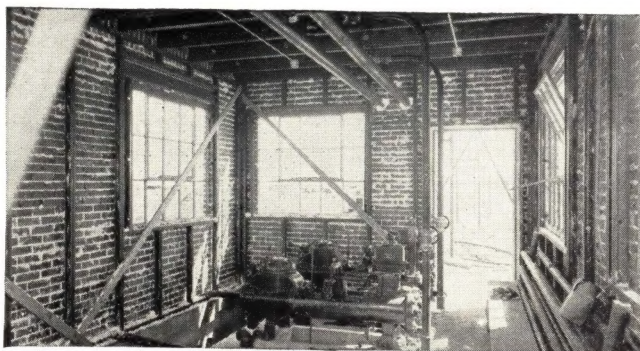
One of the most important factors in the permanency, rigidity and fire-safety of an entire structure is its roof. The use of STRAN-STEEL fulfills more completely all of the requirements and conforms more closely to traditional methods of roof construction than any other framing material. Any type of roofing material can be used.

While we recommend the use of steel sash and doors for STRAN-STEEL buildings, wooden sash or doors may be used where the fire hazard is not a problem and costs must be kept at a minimum. STRAN-STEEL lends itself to the use of all standard types of building equipment and does not require special material of any sort.



● Small dwelling houses offer an economical method of solving the housing problem in field camps, etc.

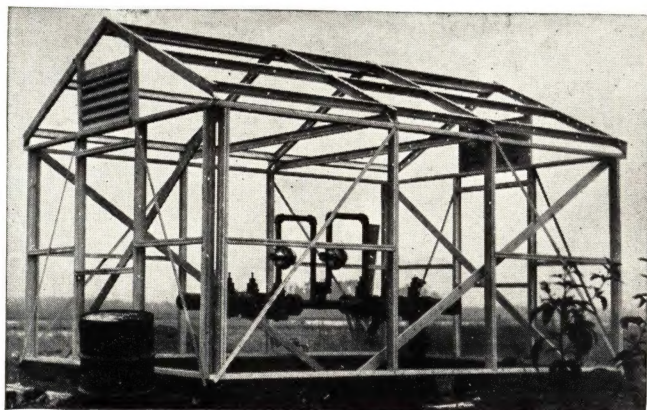
FURTHER ADVANTAGES OF STRAN-STEEL—Openings are as simple to frame in STRAN-STEEL as in conventional construction with these additional advantages: (1) openings remain true and square as framed; (2) size and locations of openings may be altered to suit conditions arising on the job by merely removing and replacing a few attaching screws.



● Interior view of pump house under construction; note use of brick for side walls.

STRAN-STEEL Construction lends itself to any type of exterior finish. For field warehouses, field offices, supply stores, meter stations, bolt and engine houses, camp and dwelling houses, and other semi-permanent construction, corrugated iron or asbestos sheeting is frequently used. The STRAN-STEEL frame is

quickly erected by the regular carpenter force in the same manner as a wooden frame building. The flexibility of this system permits each building to be tailor-made to fit each particular requirement. Additions can easily be added as needed or the general arrangement shifted about to meet special conditions.



● Small valve house on a gas line. Building to be sheeted with corrugated galvanized iron.



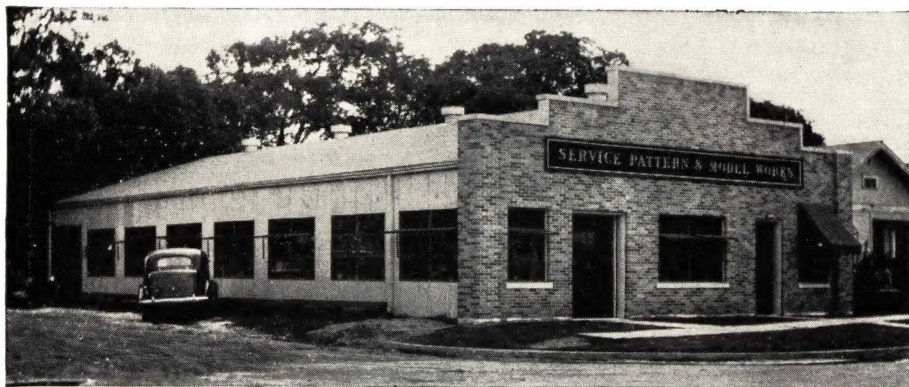
● Buildings of this type lend themselves for use as field offices, scale houses and other oil field use. This one is sheeted with corrugated asbestos.



● For permanent construction or in residence sections, oil companies use these brick clad buildings for service requirements.

When a building has served its purpose in one location, its high salvage value permits it to be dismantled and re-erected at slight expense.

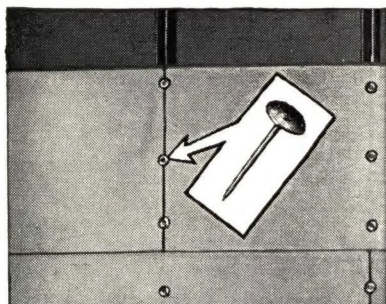
For permanent construction the exterior walls may be of brick, or stone veneer, stucco, or any of the newer exterior materials, providing a type of construction which is as permanent as solid masonry, is shrink proof, termite proof, lightning proof and fire safe.



● The small factory building illustrates the use of STRAN-STEEL with corrugated iron side walls, brick front and built up roofing.

The interior finish can be as simple or elaborate as desired. Sheet rock, plywood, wall board, plaster and other similar materials can be used with perfect freedom. STRAN-STEEL Buildings built of steel sheeting can easily be insulated against heat or cold and made as comfortable as other types of construction.

Insulated sheathing or plaster board is attached rapidly and securely to STRAN-STEEL, by nails which penetrate $1\frac{1}{4}$ " or more into nailing groove. Nail heads should be sufficiently large to prevent their pulling through and also allow them to hold firmly the adjacent edges of the material at the joints. All wiring can be easily covered.



● Illustration shows how wall board is secured to STRAN-STEEL studs at butt joints or edges with large headed roofing nails or special cup headed nails.

Where fireproof materials and steel sash are used throughout, the fire hazard is entirely eliminated, a desirable feature in meter and valve houses and other types of oil country buildings.



● This group of STRAN-STEEL buildings are used to house derrick and dock equipment and were built for this particular purpose.

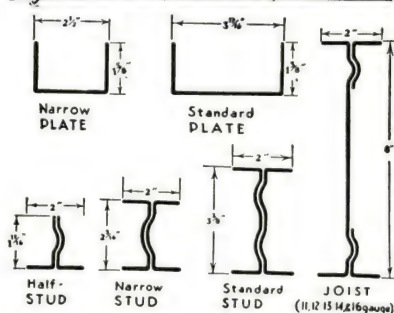
Although lightning is not ordinarily considered a major hazard, the fact remains that many fires and fatalities result each year as a result of destructive electrical storms.

A steel framed building is one of the relatively few places where one is entirely safe from lightning.

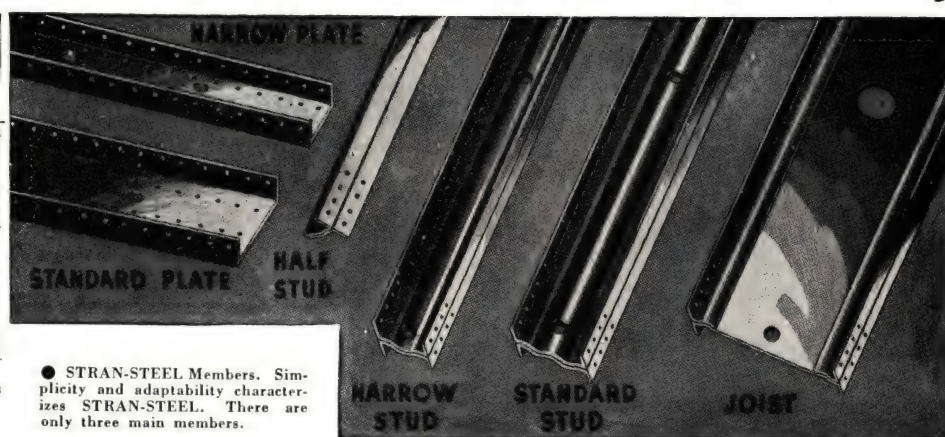


● Sheeted with asbestos board at present, this little office building is to be moved to another site and switched to brick wall construction for permanent use.

DIMENSIONS of MAIN MEMBERS



● Width over flanges and depth of STRAN-STEEL members is shown above. All are made from 16-gauge steel (.0625 in.); joists are also furnished in four other gauges as mentioned below.



● STRAN-STEEL Members. Simplicity and adaptability characterizes STRAN-STEEL. There are only three main members.

STRAN-STEEL MEMBERS—Simplicity and adaptability characterize STRAN-STEEL. There are only a few main members. One of these, the joist member, is supplied in five gauges to accommodate varying floor spans and loads. This affects material savings at each floor level and permits lower over-all dimensions without sacrificing ceiling heights. Studs and plates are furnished in two widths. Rafters are formed of either stud or joist sections.

Joists are furnished in five gauges—16, 14, 13, 12, 11. These members are used in floor construction and for roof rafters.

STANDARD STUDS, 3 $\frac{5}{8}$ In., Various Gauges—This member is used for framing outside walls as well as for inside bearing and non-bearing partitions which enclose heat ducts. Standard spacing is 2 ft. on centers.

NARROW STUD, 2 $\frac{5}{16}$ In., Various Gauges—This member is used for framing outside walls as well as for inside bearing and non-bearing partitions which enclose water, gas or steam pipes and wiring. The narrow stud is also used for short-span rafters and non-bearing ceiling joists. Set 2 ft. on centers.

HALF STUD, 1 $\frac{11}{16}$ —Used as non-bearing nailing strip in partitions built out to enclose soil pipes, extra deep

duct work, etc. Also used as lath backing in corners between studs and at ceiling between joists.

STANDARD PLATE, 3 $\frac{13}{16}$ In., 1 $\frac{5}{8}$ In. Flanges—This member is used with 3 $\frac{5}{8}$ in. stud as sill and cap plate in outside walls and partitions; also used as stringer, sill header, rib band, girt and brace. It is punched at 1 in. intervals in the flanges for aligning and attaching 3 $\frac{5}{8}$ in. studs, and in the web for attaching to joist tops.

NARROW PLATE, 2 $\frac{1}{2}$ In., 1 $\frac{5}{8}$ In. Flanges—Used with 2 $\frac{5}{16}$ in. narrow stud in the same way standard plate is used with standard studs; also used with half-stud furring.

STANDARD PUNCHING—All STRAN-STEEL main members are shop punched in the flanges, and with the exception of the half-stud, in the web to permit inter-connection.

1 $\frac{3}{16}$ in. holes are also punched in the webs of the standard studs and narrow studs to permit running conduit. The web of all joists are punched at intervals with 2 $\frac{1}{4}$ in. holes to permit running of conduits or steam, water or gas pipes at right angles to the long axis of the joist.

FIELD PUNCHING—Is easily and quickly accomplished by Standard Whitney punches.

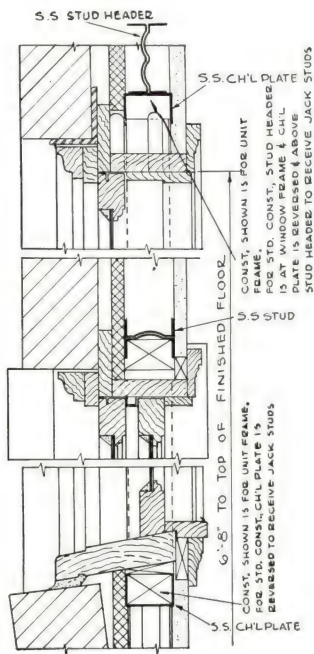


● STRAN-STEEL members are sawed to size on the job, eliminating waste and insuring economical construction and flexibility.

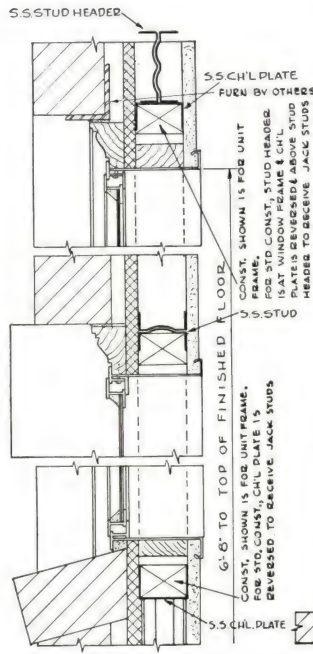


● Illustrating the method of setting floor joist and studding.

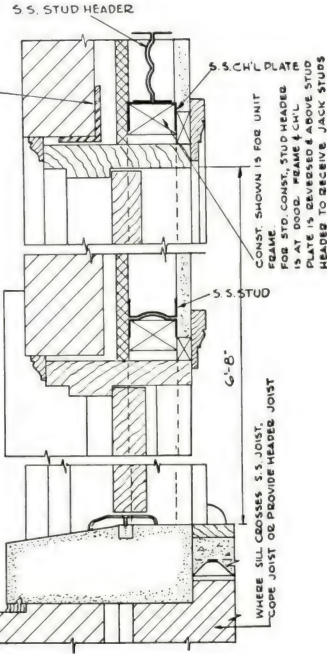
TYPICAL STRAN-STEEL DETAILS



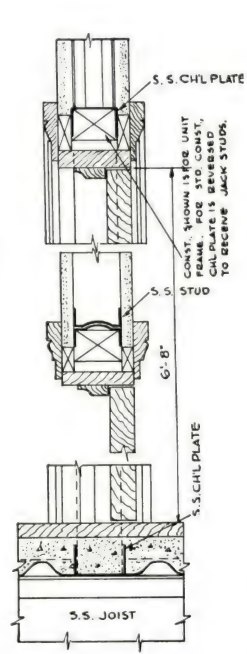
TYPICAL WOOD WINDOW



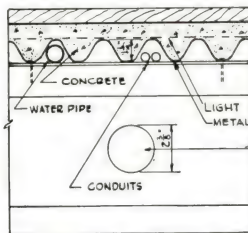
TYPICAL STEEL CASEMENT



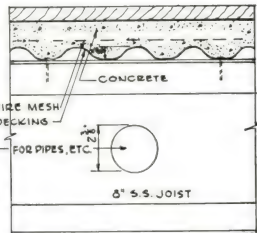
TYPICAL EXTERIOR DOOR



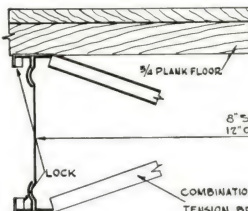
TYPICAL INTERIOR DOOR



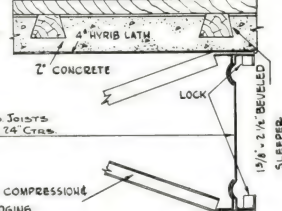
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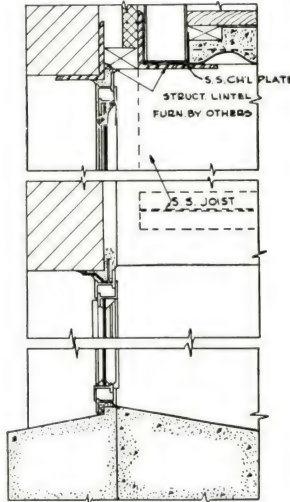
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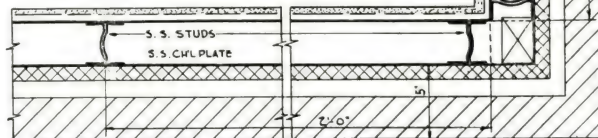
WOOD FLOOR



CONCRETE FLOOR

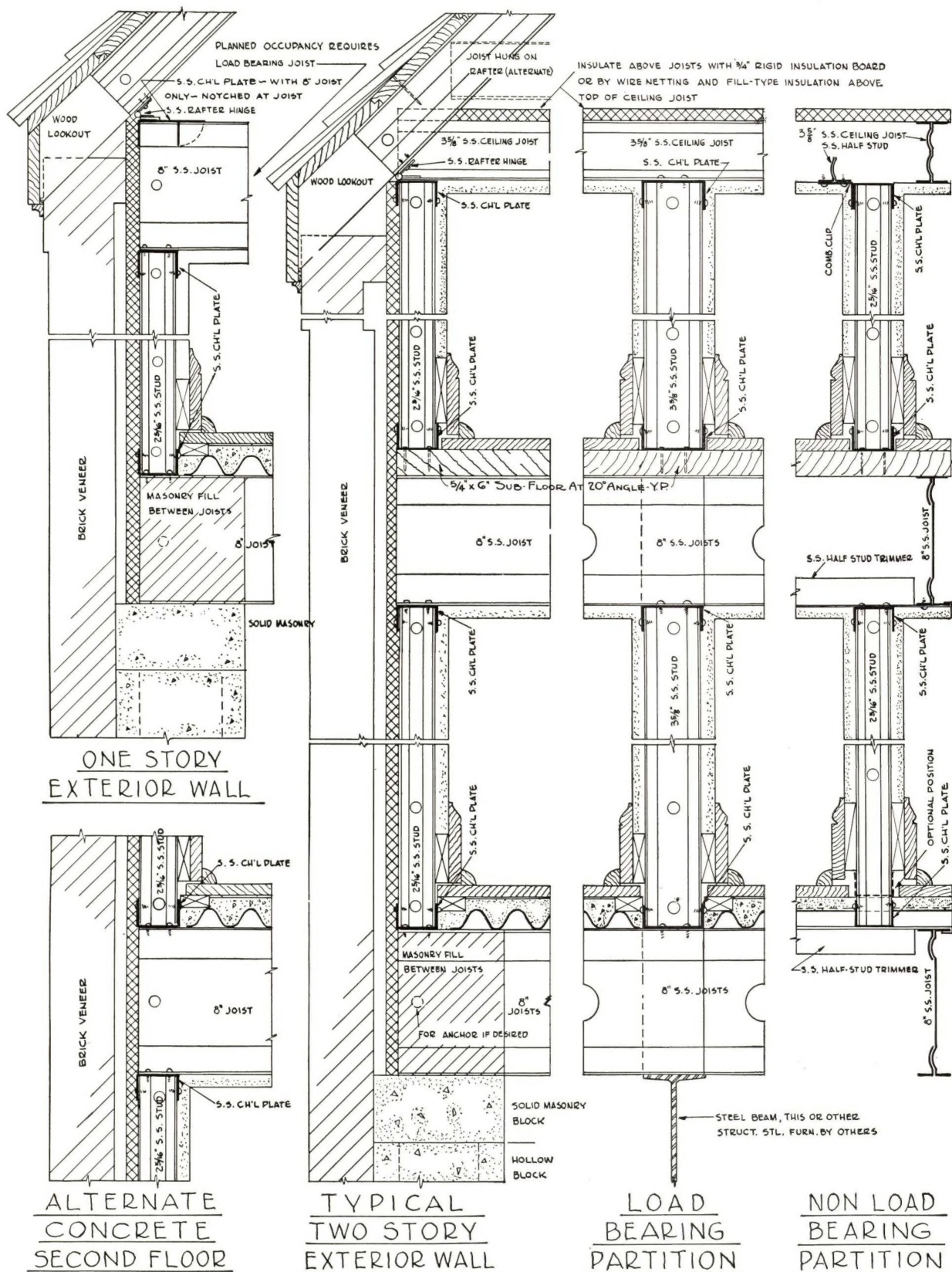


B'SM'T WINDOW



TYPICAL CORNER LAYOUT

TYPICAL STRAN-STEEL DETAILS



STRAN-STEEL *Specifications*

AND RECOMMENDATIONS SUGGESTED AS A GUIDE TO SPECIFICATION WRITERS

WORK INCLUDED—Shall be the furnishing and erection of the entire building frame composed of steel members manufactured by the Great Lakes Steel Corporation, STRAN-STEEL Division, 607 Shelby Street, Detroit, Michigan, as described in their hand book.

STRUCTURAL STEEL AND LINTELS—Where required shall be supplied, fully fabricated by general contractor as a separate item, not included in the STRAN-STEEL bill of material.

ERECTION OF FRAME—Shall be done by skilled mechanics in a substantial, workmanlike manner, true to line, level and plumb, in accordance with the manufacturer's specifications and recommendations.

SHOP PUNCHING—All framing members shall be delivered punched in accordance with the manufacturer's standard practice.

FIELD PUNCHING—All holes in addition to the standard shop punching necessary for the proper erection of the framing shall be hand-punched or drilled in the field by the erection contractor.

SHOP PAINTING—All framing members shall be given a coat of special rust-resisting paint at the shop.

FIELD PAINTING—The erection contractor shall touch up in one-coat work all spots where shop coat has been damaged.

TEMPORARY BRACING, FLOORING, ETC.—The erection contractor shall furnish and erect all necessary temporary bracing to brace and hold the framing true to line, level and plumb until the permanent bracing and complete fabrication is completed. He also shall furnish all necessary temporary floor or walkway planking required for the convenience and protection of all workmen.

JOISTS—Joists throughout shall be of sizes and spacing specified by the manufacturer. Spacing in general shall be 24" on centers. Joists shall have a wall bearing of not less than 4 inches.

TRIMMERS AND HEADERS—Double all joists or provide heavier gauge single joists of proper carrying capacity under partitions and around all floor openings for stairs, chimneys, etc. Double joists shall be fastened together with "C" clips.

JOIST HANGERS—Provide joist hangers for the support of headers and trimmers and for the support of all tail joists over 5' 0" long at headers and similar positions unless these members are coped between the flanges of the supporting beams.

CROSS BRIDGING—Provide special channel type bridging spaced 6 ft. apart on centers for all joist spans exceeding 8 ft. Bridging shall be locked by bending ends over joist flanges.

PARTITION SUPPORTS—Where partitions running parallel to the joists are not directly supported by a joist, provide half stud partition supports with coped and crimped ends spanning between two joists centered under and supporting each stud of the partition (24 in. apart on centers). Bend ends of partition supports over and screw to the top flange of the joist.

CHANNEL PLATES—Channel plates to fit studs shall be provided as sills and plates for all exterior wall studding, all interior partitions, and elsewhere where required. Channels shall be lapped and fastened with two (2) screws at all corners.

ANCHOR BOLTS—Sills for exterior wall studding on masonry walls shall be secured to masonry with $\frac{1}{2}$ " diameter hook bolts spaced 4 ft. apart on centers; anchor bolts to be furnished and built in by the masonry contractor.

STUDDING—Studs spaced, generally 24" apart on centers shall be provided for all exterior walls and interior partitions secured to sills and plates with four (4) screws each, two at top and two at bottom through diagonally opposite stud flanges. Provide jack studs between main wall sills and plates and window sills; between window and door lintels or headers and main wall plates above; for all gable walls; and wherever else required to provide nailing for enclosing exterior and interior wall material or finish. Where sills and plates with flanges are not provided to which to secure jack studs, provide stud clips. At gable end rafters provide rafter clips—nail clips to both studs and rafters and bend wings around stud flanges. Double studs at the jambs of all openings where the loads cannot be safely

carried by a single stud. Secure double studs together with "C" Clips spaced approximately 3 ft. apart on centers.

JAMB STUDS—Provide studs to serve as jamb studs at all openings where main wall or partition stud spacing does not fulfill requirements.

OPENING SILLS AND HEADERS—Sill and headers shall be provided as required for all exterior and interior wall and partition openings, and headers shall be secured by header brackets.

PARTITION FURRING—To increase the thickness of partitions to accommodate pipes, ducts, etc., furr the main partition with half studs or standard $2\frac{5}{8}$ " studs secured to narrow plates. Brace furring to main studding at center.

STAIR CARRIAGES—When specified, provide stair carriages for all stairs in pairs or threes as the width and character of the stair runs require. Frame also for all stair landings or platforms. Carriages shall be formed of stud or joist members substantially framed and secured to stairwall headers, and secured to studs with combination clips.

RAFTERS—Rafters shall be spaced 24" apart on centers. For pitched roofs, rafters shall consist of stud or joist members depending on the span and loads supported. For flat roofs, rafters shall consist of joist members. The heel of each rafter shall be secured at the wall to the wall plate with an adjustable rafter hinge screwed to both rafter and plate. Rafters shall be secured to the ridge by cutting away adjacent lower flanges and bolting together through webs of rafters. Jack rafters shall be secured at heels as specified for main rafters and at hip and valley rafters with rafter sleeve and rafter plates.

HIP AND VALLEY RAFTERS—Shall consist of stud or joist members as best adapted to spans and loads supported.

COLLAR TIES—Shall be provided to brace and tie rafters together where required. They shall consist of stud members having the flanges abutting rafters cut and bent to the plane of the webs or secure collar ties to rafters with collar tie brackets—bend wings of brackets around rafter flanges and bolt ties to brackets.

DORMERS—Where and if specified, dormers shall be constructed of STRAN-STEEL framing. Frame in the same manner as specified for similar parts of the main structure.

RECOMMENDATIONS

FLOORS (Concrete)—All subfloors shall be of 2" thick 2000 lb. 1-3-4 mix concrete, reinforced. Reinforcement shall be $\frac{1}{4}$ " diameter plain rods placed not more than 6" on centers, or $\frac{3}{8}$ " 4 lb. rib lath. Reinforcement, lath, or mesh should be stapled directly to tops of STRAN-STEEL joists. For finish wood strip floors provide $1\frac{5}{8}$ " x $2\frac{1}{2}$ " bevelled sleepers not more than 14" o.c. attached to lath and raised about $\frac{1}{4}$ " above rough concrete floor slab. Metal corrugated decking may be used as forms for 2" concrete slabs reinforced as above.

FLOORS (Wood)—In some instances under some building codes, wood subfloors may be used. Subfloors to be $5/4$ " x 6" T&G or square edged boards laid at an angle of not over twenty degrees across the joists and nailed to the tops of the STRAN-STEEL joists.

WALLS—As a plaster base secure to each stud $\frac{3}{8}$ " thick approved Gypsum board for side walls or 2.5 lb. mesh sheet lath. Gypsum board to be nailed directly to the STRAN-STEEL members with 1" diameter disc-headed cadmium plated nails spaced not over 6" o.c. If board be 16" wide, use four nails at each stud bearing.

CEILINGS—As a plaster base secure to each joist $\frac{1}{2}$ " thick approved gypsum board or a $\frac{3}{8}$ " 3.4 lb. rib lath. Gypsum board shall be secured in manner and with same nails as specified under "Walls."

EXTERIOR WALL INSULATING SHEATHING—Not less than $\frac{1}{2}$ " approved insulating board shall be nailed to each stud on exterior face of exterior wall with same nails as specified under "Walls."

Typical Non-Residential jobs where Stran-Steel has been used with success.

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Shrine of The Little Flower, Royal Oak.



Steel framing for gasoline station.



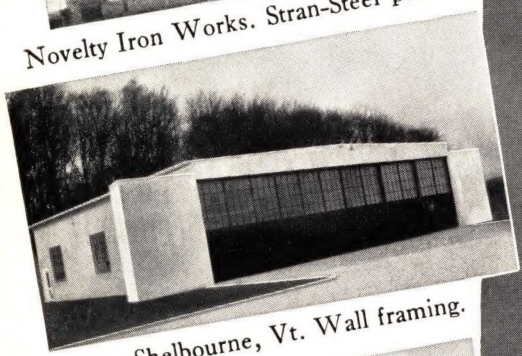
Novelty Iron Works. Stran-Steel purlins.



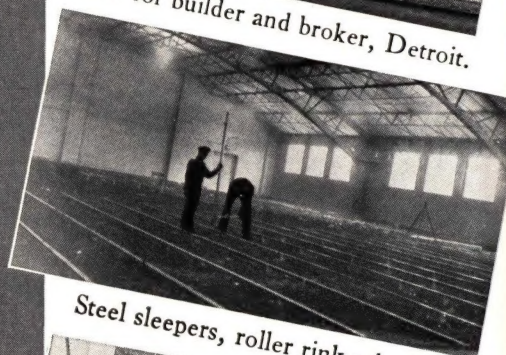
Italian Building, World's Fair, Chicago.



Hangar, Shelbourne, Vt. Wall framing.



Office for builder and broker, Detroit.



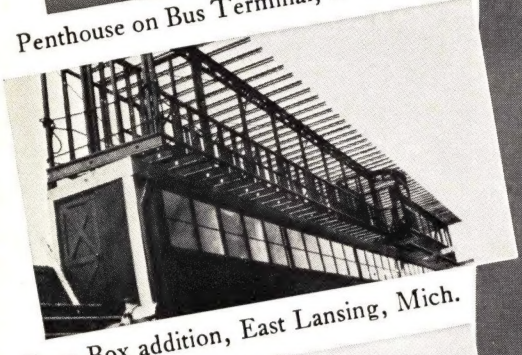
Penthouse on Bus Terminal, Kansas City.



Steel sleepers, roller rink sub-floor.



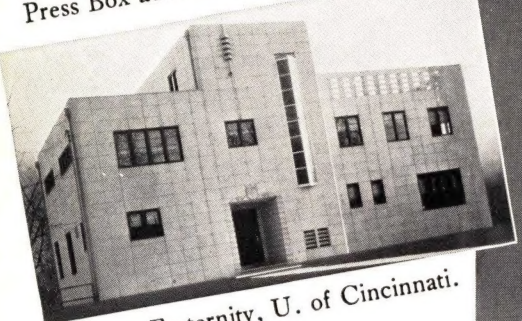
Press Box addition, East Lansing, Mich.



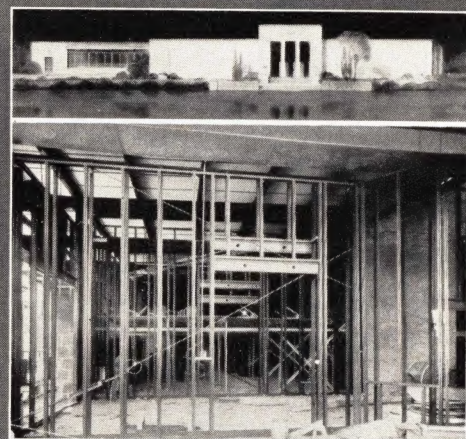
Remodelling, Cincinnati railroad office.



Δ. T. Δ. Fraternity, U. of Cincinnati.



STRAN-STEEL *for* INDUSTRIAL USES



Stran-Steel partitions, Texas Centennial,
Fine Arts Building, Dallas, Texas.

Pump building, Bay Petroleum Co., Denver.